USS MISSOURI
(Battleship MISSOURI)
(BB63)
Batttleship Row, Ford Island
Pearl Harbor
Honolulu County
Hawaii

HAER HI-62
HI-62

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

USS MISSOURI
(Battleship Missouri)
(BB63)

HAER No. HI-62

RIG/TYPE OF CRAFT:	Iowa Class Battleship
TRADE:	Naval
OFFICIAL NUMBER:	BB-63
PRINCIPAL DIMENSIONS[1]:	Length: 887'-3" (overall) Beam: 108'-2" (maximum) Depth: 28'-11" Displacement: 45,000 tons (standard, 1945) 57,450 (full load, 1945) 57,500 (full load, 1988)
LOCATION:	Ford Island, Pearl Harbor, Hawaii
DATES OF CONSTRUCTION:	6 January 1941 – 11 June 1944
DESIGNER:	Unites States Navy, New York Naval Shipyard
BUILDER:	New York Naval Shipyard
PRESENT OWNER:	USS Missouri Memorial Association, Honolulu, Hawaii
PRESENT USE:	Museum ship
SIGNIFICANCE:	USS MISSOURI was the last battleship built by the United States. Her type dominated naval strategy and tactics until World War II when aircraft carriers supplanted battleships as the dominant capital ship fielded by navies. Though aircraft carriers came to the fore during World War II, MISSOURI, along with other battleships, played an important part in the war effort. They screened the carriers from air attack, bombarded targets on shore, and engaged enemy surface units. MISSOURI participated in

[1]Other sources list the beam as 108'-3" and the full load as 58,000. See http://www.ussmissouri.com/new_dimensions.htm, accessed March 14, 2002, and Ian Sturton, *Conway's All the World's Battleships: 1906 to the Present* (Annapolis, Maryland: United States Naval Institute Press, 1988), Appendix A, 154.

several important campaigns against the Japanese during the final eighteen months of World War II. Japanese officials even signed their surrender at a ceremony held on MISSOURI's decks. MISSOURI went into action again during the Korean War where her heavy gun batteries engaged enemy installations ashore. After her Korean service, the U.S. Navy placed MISSOURI in reserve status for almost three decades. She was reactivated during the American military buildup in the 1980s and conducted attacks against Iraqi targets as part of Operation Desert Storm in 1991. The U.S. Navy decommissioned her for a second time on March 31, 1992. Though designed for an era of warfare that passed even before her launch, MISSOURI served intermittently for almost fifty years and participated in three major conflicts involving U.S. forces.

HISTORIAN: Marc Porter, 2002

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The project was prepared under the direction of HAER Maritime Program Manager Todd Croteau. The historical report was produced by Marc Porter and edited by Justine Christianson, HAER Historian. The historic photographs included in this report came from the U.S. Navy's Naval Historical Center Photographic Collection.

History of Battleships Before World War II

The launch of HMS DREADNOUGHT by the Royal Navy in 1906 represented a design revolution that sparked an arms race and dominated naval planning until World War II. Measuring 527' long with a maximum beam of 82', DREADNOUGHT was revolutionary because of her ability to fire a devastating broadside of eight 12" guns and carry ten of the massive weapons, as opposed to other ships that could manage only a four gun broadside. DREADNOUGHT also had steel armor plating up to 11' thick in places to protect her from enemy fire. She was the first major warship equipped with steam turbine engines. This engineering innovation pushed her top speed to 21 knots while other battleships of the era were limited to short runs at 18 or 19 knots. DREADNOUGHT was a big, fast ship, capable of delivering massive blows while withstanding heavy return fire. For the next thirty-five years, navies were built around battleships and the premise that naval warfare would center on long range gunnery duels between heavily armored ships. Admirals envisioned long lines of battleships jockeying for optimal firing positions from which to lob shells at similarly equipped enemies.

The construction of DREADNOUGHT created a naval arms race among the maritime powers, particularly Germany, as each nation attempted to match DREADNOUGHT's power with ships of its own. The United States, while not in a direct competition with any nation (unlike the competition between Germany and Great Britain), was nevertheless spurred on to construct new ships. The United States' first modern battleships, SOUTH CAROLINA and MICHIGAN, were laid in 1906, followed with a steady program of new construction. The two early U.S. entrants into the ranks of modern battleships were actually constructed before DREADNOUGHT, but the slow pace of U.S. naval construction led to the British vessel entering service first.

The first meeting between modern battleships occurred between Britain and Germany during World War I at the Battle of Jutland in 1916. There was no clear victor since ships were sunk on both sides, but each side pointed to different aspects of the battle and claimed a victory. While Jutland and several smaller skirmishes did little to change the outcome of the war, they did demonstrate the awesome firepower of squadrons of battleships operating in close formations. These encounters also suggested a host of tactical and technological improvements for future ships and battles.

The world's major naval powers, weary from the expense and trauma of World War I, agreed to a naval limitation treaty in 1922. The Washington Naval Treaty limited the size of individual vessels and the total size of fleets for Great Britain, France, Italy, Japan, and the United States. As the loser in World War I, Germany was excluded from the treaty and prohibited from building new warships. Great Britain, Japan, and the United States renewed the treaty in 1930 as the London Naval Treaty. The renewal included an agreement to not build any new capital ships until 1937. In 1935, the Anglo-German Naval Treaty readmitted Germany into the ranks of naval powers but limited German naval strength to a percentage of Great Britain's strength. The 1935 treaty allowed German parity in submarine construction, a provision that would profoundly influence the looming conflict.

War appeared likely by 1936 with the resurgence in German nationalism and Japanese expansion in the Pacific. At the end of 1936, Japan announced its withdrawal from the naval treaty. Great Britain and the United States responded by announcing their intention to build new capital ships, larger than any allowed by the now defunct treaty. DREADNOUGHT weighed in around 21,485 tons when she went to sea. In the buildup to WWI, the size of battleships increased into the 30,000 ton range. The naval limitation treaties of the 1930s capped ship size at 35,000 tons but when those lapsed, new and much larger battleships began to take shape. Free of treaty restrictions, for example, the U.S. Navy began an intensified building program to prepare for the possibility of a naval war in the Pacific or Atlantic. Though the United States and her future enemy, Japan, both embraced naval aviation to a greater extent than other maritime powers, they still continued to build battleships along with aircraft carriers.

The Iowa Class

The U.S. Navy's first battleships designed wholly after the abrogation of the naval arms limitation treaties were the Iowa class vessels. The design phase for the vessels began in 1938, long before the first keel laying ceremony. The design phase was drawn out and often contentious as factions within the U.S. Navy and the federal government clashed over the direction the new design would take. In the battleship design, debate swirled over the tradeoffs between speed, firepower, and armor. The immediate predecessor of the Iowa battleships were the South Dakota class battleships designed in 1937-1938. These four vessels carried heavy 16" guns and thick armor, but their speed was limited to 27 knots. With a Pacific war looming on the horizon, a split emerged among naval planners about which characteristics to emphasize in the newest battleships. Some planners advocated ships that could reach higher top speeds and keep pace with other naval units, namely destroyers and aircraft carriers. Other authorities lobbied for heavier guns or more 16" guns per vessel. Ships the size of the South Dakota class battleships, 680' overall, could have been built to be faster than 27 knots by reducing the size of the armament or by using lighter armor. Similarly, the same basic platform could carry heavier armor or armament, but without an increase in speed. Many naval officers found the loss of offensive power and survivability inherent in lightening the South Dakota design for increased speed to be unacceptable. Others insisted that increased speed was essential.[2]

Ultimately, the U.S. Navy produced two prosaically named studies: "fast battleship" and "slow battleship". The "fast battleship" study produced four design variants. The first design was extremely fast but thinly armored and was discarded since it was more of a cruiser type design. Two other variants called for twelve 16" guns per vessel, but both were deemed too heavy and too expensive. The remaining design was based on the concept of an enlarged South Dakota class. The vessel's beam remained the same at 108' to allow passage through the Panama Canal, but the length increased to afford greater speed. The speed of any non-planing vessel is a direct function of its waterline length, so longer vessels have a higher top speed (1.34 times the square root of length at the waterline). To take advantage of the longer waterline, the new design called for engines that were more powerful than those used in the South Dakota class. This design

[2] Sturton, *Conway's All the World's Battleships*, 181.

mounted nine 16" guns and heavy armor, but was capable of speeds above 32 knots, thereby satisfying advocates of speed, firepower and armor by using a platform size no longer constrained by treaty limitations.[3]

On May 17, 1938, Congress authorized the construction of two new battleships based on the surviving design from the "fast battleship" study. The U.S. Navy awarded the first construction contract to New York Navy Yard in July 1939. Construction began on IOWA, first of a projected four ship construction run and namesake of the class, in June 1940. The Philadelphia Navy Yard began building the second Iowa class battleship, NEW JERSEY, in September 1940. Work on the second pair of Iowa class battleships began in January 1941, with MISSOURI taking shape at the New York Navy Yard and the Philadelphia Navy Yard building WISCONSIN. Naval yards began a third pair of the battleships that were never completed.[4]

The new U.S. battleships were unlike anything that came earlier. They were larger and more heavily armed than Germany's BISMARCK and Great Britain's KING GEORGE V. Japan's YAMAMOTO enjoyed slight advantages in armor and gun size but was far less suited to extended long range deployments. Finally, when it came to speed, the Iowa class was without peer.[5]

Battleships in World War II

The early years of WWII, especially in the Pacific Theater, had inaugurated a new era of naval warfare, including the emergence of a new capital ship. From tentative developmental steps in the 1920s and 1930s, the aircraft carrier matured into the dominant naval weapon by the early 1940s. The destruction of almost the entire U.S. Pacific battleship fleet by Japanese carrier-based aircraft during the attack on Pearl Harbor confirmed the arguments of a few visionary military thinkers and marked a sea change in naval warfare. Battles were no longer planned or fought in line-ahead formations of big gun battleships. The new capital ships stalked each other from hundreds of miles apart as their aircraft fanned out across the sea in search of targets. Offensive strikes by carrier aircraft against other ships could reach far beyond the range of a 16" gun and land targets safely beyond the reach of naval gunfire.

The new capital ships were powerful offensive weapons, but they were somewhat ill-equipped to defend themselves. Their fighter aircraft could intercept inbound bombers or torpedo planes but the fighters could stay up only for a finite time because they periodically needed to land to refuel and rearm, putting the carrier in a vulnerable position. Moreover, fighters were often detailed to accompany offensive missions, leaving a diminished presence to ward off attackers. Carriers carried some anti-aircraft weapons but generally not enough to cope with a heavy attack from the

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[3] Robert F. Sumrall, *Iowa Class Battleships: Their Design, Weapons and Equipment* (London: Conway Maritime Press, 1988), 25.
[4] William H. Garzke and Robert O. Dulin, Jr., *Battleships: United States Battleships, 1935-1992* (Annapolis, Maryland: Naval Institute Press, 1995), 112-114.
[5] See Appendix I for Iowa class specifications.

air and wholly inadequate to cope with any major surface ships that might penetrate the defensive screen of aircraft. Adding to the other problems was lack of armor. The most effective carriers were fast, which gave them the ability to enter an area, launch air strikes, and exit the area rapidly. Speed was a virtue, especially in a war zone as large as the Pacific, but it came with a price. To maximize speed, naval designers were forced to make do with very light armor.

As a result of their thin skin, the powerful yet vulnerable carriers needed bodyguards. This was a role that suited the ships recently supplanted as the centerpiece of battle fleets. Battleships could absorb tremendous punishment, and their main batteries could smash any surface ship that came within range. Their decks bristled with smaller guns suited to anti-aircraft defense. The most modern battleships were quite fast and therefore capable of keeping up with the carriers. For added value, the battleships could detach from the carriers to shell shore targets at night when most carrier aircraft did not fly. They could also hit targets so heavily defended that attacking aircraft would suffer prohibitively heavy losses. MISSOURI and her sisterships went to war, therefore, to form a protective screen around the aircraft carriers and provide fire support for battles on land. Instead of line-ahead formation, the WWII battle fleets formed into large groupings of ships with carriers forming the nucleus and surrounded by escorts ranging from destroyers to battleships.

MISSOURI in WWII

The U.S. Navy launched MISSOURI on January 29, 1944, after Margaret Truman, the future president's daughter, broke the obligatory bottle of champagne on the bow. The fitting-out period lasted until June 11, 1944, when MISSOURI was officially commissioned. Her first months as a warship were spent conducting trial voyages and training exercises along the East Coast. MISSOURI departed Norfolk, Virginia on November 11, 1944, enroute to the Pacific Theater. She passed through the Panama Canal, with less than a foot clearance on either side, on November 18 and turned north toward San Francisco. The battleship departed San Francisco in mid-December and arrived at Ulithi on January 13, 1945.[6]

Two weeks after arriving at Ulithi, MISSOURI steamed out to sea on her first combat mission. The new addition to the fleet joined a carrier task force headed toward Japan's home islands. On February 16, with MISSOURI and other escorts providing cover from possible enemy attack, the aircraft carrier LEXINGTON launched the first air strikes against Japan since Doolittle's Raid in early 1942.[7]

MISSOURI spent the early months of 1944 alternating between screening fast carrier groups from enemy attacks and bombarding enemy shore installations in support of the Iwo Jima and Okinawa invasions. During these months, MISSOURI shot down at least nine enemy planes and

[6] Navy Department, Naval History Division, *Dictionary of American Naval Fighting Ships, Volume 4* (Washington, D.C.: Government Printing Office, 1959), 393-395. (Hereafter cited as DANFS.)
[7] DANFS, 393-395.

contributed to the destruction of several others. She also destroyed many targets ashore and initiated a search that led to the sinking of a Japanese submarine. Kamikaze planes managed to penetrate the curtain of anti-aircraft fire and hit the battleship twice during the battle for Okinawa. Neither crash did much damage to the heavily armored MISSOURI.[8]

In early May the battleship received orders sending her to Guam. Admiral William F. Halsey boarded MISSOURI on May 18, 1945, and made her his flagship for the Third Fleet. With Halsey aboard, the ship returned to support the Okinawa invasion. Her time off the coast of Okinawa was interspersed with raids against Japan proper until early June when she steamed for the Philippines and a brief respite. The battleship returned to action during the second week of July, this time against targets in Japan exclusively. MISSOURI spent the remainder of the war bombarding the shores of Honshu and Hokkaido.

Word of Japan's imminent surrender reached the fleet on August 15, 1945. MISSOURI entered Tokyo Bay on August 29, 1945. Four days later military leaders from the Allied powers and the representatives from Japan's imperial government convened on the decks of MISSOURI to sign the surrender that ended World War II. After the signing, MISSOURI did not linger in Japanese waters. Admiral Halsey transferred his command to another battleship four days after the surrender and the battleship headed for the United States. She arrived safely in New York on September 28, after a voyage that included stops in Guam and Hawaii. Upon her arrival in New York, MISSOURI became the flagship for Admiral Jones Ingram, commander of the U.S. Atlantic fleet.

Post-WWII

The veteran battleship spent the next several years steaming between ports in the Atlantic, Mediterranean, and Caribbean in support of U.S. foreign policy interests and naval readiness. She had the honor of carrying President Truman and his family home from a conference in Rio de Janeiro in 1947. MISSOURI also benefited from several trips to the shipyard for repairs and renovations, including a five-month visit to Norfolk Naval Shipyard from 1949-1950.

On January 17, 1950, MISSOURI ran hard aground in lower Chesapeake Bay. Her momentum was sufficient to carry the ship more than 2,000' out of the channel and lift her 7' above the waterline. A massive effort by naval and civilian personnel managed to free the stranded battleship on February 1, 1950, two weeks after running aground. Damage sustained in the grounding incident was minor, and MISSOURI was back in service by mid-February.[9]

Korean War

[8] DANFS, 393-395.
[9] DANFS, 393-395.

MISSOURI left the Atlantic on August 19, 1950, bound once again for a war zone. MISSOURI joined the United Nations mandated military effort against the North Korean invasion of South Korea. There was very little naval action in the Korean War, so MISSOURI never went into battle against enemy ships; instead, she served as a floating artillery battery. From September 14, 1950 to March 28, 1951, MISSOURI provided heavy fire support to U.N. troops fighting against North Korean and Chinese forces. From Korea, the battleship returned to the Atlantic to conduct training cruises and undergo an overhaul at the Norfolk Naval Shipyard. MISSOURI went back into action off the coast of the Korean Peninsula in October 1952. Alternating gunnery missions and visits to Japan kept MISSOURI busy until April 1953.[10]

Battleship Activities Post-Korean War

After returning home to Norfolk the battleship embarked on a series of training cruises; the last one, to European waters, ended on August 3, 1954. The battleship departed for the West Coast twenty days later, making her way to the Puget Sound Naval Shipyard, where she underwent decommissioning and entered the reserves as part of the mothball fleet.[11] The battleships built by the U.S. Navy on the eve of WWII, including MISSOURI, were in many ways outdated by the time they hit the water. A decade later, it was difficult to find a role for the battleships in a navy dominated by carrier aviation, jet aircraft, missiles, and the potentialities of nuclear power for weapons and propulsion. One by one, therefore, the U.S. Navy took the battleships out of service and placed them in storage. Small skeleton crews kept them maintained to the point where they could, given plenty of warning, be reactivated if needed. Iowa class battleships were the apex of development for the type, but they were also the last of the type built. By the mid-1950s, it seemed as if their careers were at an end. Given the rapid pace of technological change it is not surprising that newer ships and new tactics relegated the battleships to mothballs so quickly. What is surprising, however, is that every one of the Iowa class battleships made it back out of the reserve fleet and three of them saw further combat.

NEW JERSEY reentered service during the Vietnam War to provide fire support for U.S. forces pitted against insurgents fighting to unify North and South Vietnam. Like battleship service in Korea, her involvement was limited to shelling distant terrestrial targets. The U.S. Navy decommissioned NEW JERSEY after Vietnam, and she returned to the reserve fleet. Her sister ships would have to wait a few more years before returning to duty.

During the Reagan presidency, the Defense Department expanded the U.S. Navy to meet the perceived challenge offered by an expansion of the Soviet Navy. To help reach the administration's stated goal of deploying a 600-ship navy, plans were drawn up to renovate and reactivate the Iowa class battleships. The move to restore the battleships to active duty originated in Congress as much as anywhere else. Many lawmakers saw them as cheaper than new vessels and as a way to hit enemy targets without risking the political fallout of having

[10] DANFS, 393-395.
[11] DANFS, 393-395.

pilots killed. The U.S. Navy began readying NEW JERSEY for service in 1981. The other three followed her onto active duty shortly thereafter.

Each battleship cost the government about $71 million to build originally, but it cost $325 million to restore NEW JERSEY to fighting trim and around $470 million apiece for each of the other three vessels. NEW JERSEY was less expensive because she had benefited from the Vietnam War-era reactivation. Despite the almost $2 billion spent to restore the Iowa class, it was probably a cost-effective move since new construction would have carried an even higher price tag. The improved Iowa class battleships carried their original 16" guns and 5" guns. They also went to sea armed with Tomahawk cruise missiles, Harpoon anti-ship missiles, and modern anti-aircraft weapons. Each also benefited from modernized electronics and communications equipment, as well as various habitability improvements. For aerial reconnaissance and gunnery spotting, the navy equipped the resurrected battleships with unmanned reconnaissance aircraft; the newly renovated battleships had facilities to support helicopter operations, though not to store helicopters onboard. The result was that a weapons platform defined for a style of warfare not seen since Jutland in 1916 was updated to include new technology and made to fit as part of a modern navy.[12]

MISSOURI in the Gulf War

On the fiftieth anniversary of the day shipyard workers laid MISSOURI's keel, the battleship prowled off a hostile coast, waiting for the order to go to war. Eleven days later the order arrived. Iraqi military forces under the direction of Saddam Hussein invaded Kuwait and positioned themselves to menace Saudi Arabia in August 1990. By January 17, 1991, a U.S. led coalition was ready to end Iraq's occupation of Kuwait. From her patrol station in the northern Persian Gulf, MISSOURI helped fire the opening salvo of Operation Desert Storm. MISSOURI's first punch was directed at fixed targets on shore. Unlike MISSOURI's earlier fire support operations in WWII and Korea, the massive main batteries remained silent, though they would engage targets later in the war. For the first strike, the WWII vintage battleship fired a decidedly modern weapon, Tomahawk cruise missiles. These missiles used satellites and terrain-following navigation systems to hit targets far beyond the range of MISSOURI's guns. MISSOURI's sister ship, WISCONSIN, contributed to the barrage and served as the cruise missile strike commander for naval forces in the Persian Gulf.[13]

On February 2, a frigate with advance sonar guided MISSOURI through an Iraqi minefield and into firing position. The battleship's main batteries began firing on an enemy headquarters, which was the first time the guns had fired in anger since the Korean War. Over the next three

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[12] William H. Garzke, "Surface Combatant Ships," in Harry Benford, *A Half Century of Maritime Technology 1943-1993* (Jersey City, New Jersey: The Society of Naval Architects and Marine Engineers, 1993), 376. The MISSOURI was greatly altered after the renovations. While not eligible to be a National Historic Landmark as a result of the renovations, the ship has been listed on the National Register of Historic Places for its historic importance since 1972. See http://www.nationalregisterofhistoricplaces.com/wa/Kitsap/state.html. for more information on the National Register nomination.

[13] "U.S. Navy in Desert Storm/Desert Shield," http://www.history.navy.mil/wars/dstorm/ds5.htm.

days, MISSOURI hurled 112 rounds at Iraqi targets. On February 6, WISCONSIN took over from MISSOURI and continued to engage a variety of targets. WISCONSI used an Unmanned Aerial Vehicle, essentially a large remote control plane with video feeds back to the ship, to direct her fire. This was the debut of unmanned spotter aircraft for naval gunfire.[14] The two battleships took turns pounding Iraqi positions throughout the remainder of the war. Both fired more than one million pounds of ordinance during their time in the Persian Gulf and destroyed several enemy targets. Moreover, their presence and heavy fire lent credence to the American effort aimed at convincing the Iraqi leadership that an amphibious invasion on their flank was immanent. The amphibious invasion was a feint that drew attention from the overland armored assault that routed the Iraqi Army.[15]

MISSOURI's thick armor was not tested during the Gulf War, though she was the target of a missile attack launched by Iraqi forces occupying positions along the Kuwaiti coast. One of the two missiles launched by the Iraqi military tracked off course and crashed into the water. The second appeared headed for the battleship but a defensive missile fired from a British destroyer destroyed the Iraqi missile before it reached MISSOURI.[16]

MISSOURI returned to Pearl Harbor from the Persian Gulf in time to participate in commemorative ceremonies marking the fiftieth anniversary of the Japanese attack on December 7, 1941.

Decommissioning

The U.S. Navy decommissioned MISSOURI on March 31, 1992. MISSOURI spent the first few years of her retirement in Bremerton, Washington, as an inactive vessel subject to recall, but in 1995 she was officially removed from the naval inventory. The federal government donated the battleship to the USS MISSOURI Memorial Association in 1998. The association moved MISSOURI to Pearl Harbor and opened her to the public as a museum and memorial. Today she rests at a dock within view of the USS ARIZONA memorial. The two battleships stand as appropriate symbols of U.S. involvement in WWII. ARIZONA is a reminder of the attack that caught the fleet unaware at the outset, and MISSOURI as a testament to the military and industrial strength used to bring the war to an end.[17]

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[14] "U.S. Navy in Desert Storm/Desert Shield," http://www.history.navy.mil/wars/dstorm/ds5.htm.
[15] "U.S. Navy in Desert Storm/Desert Shield," http://www.history.navy.mil/wars/dstorm/ds5.htm.
[16] "U.S. Navy in Desert Storm/Desert Shield," http://www.history.navy.mil/wars/dstorm/ds5.htm.
[17] The other three Iowa class battleships left active duty in 1991-1992. As of 2002, all four survive. NEW JERSEY and WISCONSIN are currently museum/memorial ships like MISSOURI, while IOWA remains part of the U.S. Navy's reserve fleet.

APPENDIX I: Iowa Class Specifications[18]

Hull Characteristics:

Length Overall:	887'
Maximum Beam:	108'
Draft:	34'
Full load displacement:	57,500 tons

Decks:

Teak wood decking was used for several reasons. Wood reduced the chances of accidental ignition from the black powder ignition pads used to propel the 16" rounds. Wood would also have been cooler than steel decking and slip resistant. Teak was specifically used because of its hardness and its resistance to dry rot and the effects of the sun, salt water, and termites.

Armament:

Nine 16" guns
Twenty 5" guns (reduced to twelve in the 1980s)
Assorted 20mm and 40mm anti-aircraft guns (numbers and arrangement varied by ship and era)
Sixteen Harpoon missiles (added in the 1980s)
Thirty-two Tomahawk missiles (added in the 1980s)

Armor:

Steel armor ranging from 0.88 to 19.7" in thickness depending on location

Machinery:

Eight Babcock and Wilcox boilers with a working pressure of 565 psi and temperature of 850 degrees Fahrenheit
Four turbine sets
212,000 horsepower in forward, 44,000 horsepower in reverse
Four propellers (two five blade and two four blade props)
Four rudders

Speed:

In excess of 33 knots

Tankage:

Capacity for carrying 8,624 tons of fuel oil
Capacity for carrying 777 tons of potable water

Range:

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[18] Sumrall, 154-159; Frequently Asked Questions, http://www.ussmissouri.com/faq.aspx., last accessed March 14, 2002.

15,000 nautical miles at 15 knots

Manning:

2,788 men in 1945
1,510 men in 1988

APPENDIX II: List of MISSOURI's Commanding Officers, 1944-1990

NAME	DATE
Captain William M. Callaghan	June 11, 1944 - May 14, 1945
Captain Stuart S. Murray	May 14, 1945 - November 6, 1945
Captain Roscoe H. Hillenkoeter	November 6, 1945 - May 31, 1946
Captain Tom B. Hill	May 31, 1946 - April 2, 1947
Captain Robert L. Dennison	April 2, 1947 - January 23, 1948
Commander John B. Colwell	January 23, 1948 - February 23, 1948
Captain James H. Thach, Jr.	February 24, 1948 - February 5, 1949
Captain Harold P. Smith	February 5, 1949 - December 10, 1949 February 7, 1950 - April 19, 1950
Captain William D. Brown	December 10, 1949 - February 3, 1950
Commander George E. Peckham	February 3, 1950 - February 7, 1950
Captain Irving T. Duke	April 19, 1950 - March 2, 1951
Captain George C. Wright	March 2, 1951 - October 18, 1951
Captain John Sylvester	October 18, 1951 - September 4, 1952
Captain Warner R. Edsall	September 4, 1952 - March 26, 1953
Captain James R. North	March 26, 1953 - April 4, 1953 September 18, 1954 - February 26, 1955
Captain Robert Brodie, Jr.	April 4, 1953 - April 1, 1954
Captain Robert T.S. Keith	April 1, 1954 - September 18, 1954
Captain Albert Lee Kaiss	May 10, 1986 - June 20, 1986 June 13, 1990 - March 31, 1992
Captain James A. Carney	June 20, 1986 - July 6, 1988
Captain John J. Cherneskey	July 6, 1988 - June 13, 1990

APPENDIX III: List of U.S. Battleships

Note: Builder Codes:
WC: William Cramp and Sons, Philadelphia, PA
UIW: Union Iron Works, San Francisco, CA
NNS: Newport News Shipbuilding, Newport News, VA
MB: Moran Brothers, Seattle,WA
BIW: Bath Iron Works, Bath, ME
FRS: Fore River Shipbuilding Company, Quincy, MA
NYNY: New York Navy Yard, Brooklyn, NY
NYS: New York Shipbuilding Corporation, Camden, NJ
BNY: Brooklyn Navy Yard, Brooklyn, NY
MINY: Mare Island Navy Yard, San Francisco, CA
NNY: Norfolk Navy Yard, Portsmouth, VA
BS: Bethlehem Shipbuilding Corporation, Quincy, MA
NYNS: New York Naval Shipyard, New York, NY
PNY: Philadelphia Navy Yard, Philadelphia, PA
PNS: Philadelphia Naval Shipyard, Philadelphia, PA

NAMES	NUMBER	LAUNCHED	DECOMMISSIONED	BUILDER
INDIANA	BB 1	February 1893	January 1919	WC
MASSACHUSETTS	BB 2	June 1893	March 1919	WC
OREGON	BB 3	October 1893	August 1919	UIW
IOWA	BB 4	March 1896	March 1919	WC
KEARSARGE	BB 5	March 1898	May 1920	NNS
KENTUCKY	BB 6	March 1898	May 1920	NNS
ILLINOIS	BB 7	October 1898	October 1921	NNS
ALABAMA	BB 8	May 1898	May 1920	WC
WISCONSIN	BB 9	November 1898	May 1920	UIW
MAINE	BB 10	July 1901	July 1920	WC
MISSOURI	BB 11	December 1901	September 1919	NNS
OHIO	BB 12	May 1901	May 1922	UIW
VIRGINIA	BB 13	April 1904	August 1920	NNS
NEBRASKA	BB 14	October 1904	July 1920	MB
GEORGIA	BB 15	October 1904	July 1920	BIW
NEW JERSEY	BB 16	November 1904	August 1920	FRS
RHODE ISLAND	BB 17	May 1904	June 1920	FRS
CONNECTICUT	BB 18	September 1904	March 1923	NYNY
LOUISIANA	BB 19	August 1904	October 1920	NNS
VERMONT	BB 20	August 1905	June 1920	FRS
KANSAS	BB 21	August 1905	December 1921	NYS
MINNESOTA	BB 22	April 1905	December 1921	NNS
MISSISSIPPI	BB 23	September 1905	July 1914	WC
IDAHO	BB 24	December 1905	July 1914	WC
NEW HAMPSHIRE	BB 25	June 1906	May 1921	NYS
SOUTH CAROLINA	BB 26	July 1908	December 1921	WC
MICHIGAN	BB 27	May 1908	February 1922	NYS

DELAWARE	BB 28	February 1909	November 1928	NNS
NORTH DAKOTA	BB 29	November 1908	November 1923	FRS
FLORIDA	BB 30	May 1910	February 1931	NYNY
UTAH	BB 31	December 1909	December 1941	NYS
WYOMING	BB 32	May 1911	August 1947	WC
ARKANSAS	BB 33	January 1911	July 1946	NYS
NEW YORK	BB 34	October 1912	August 1946	BNY
TEXAS	BB 35	May 1912	April 1948	NNS
NEVADA	BB 36	July 1914	August 1946	FRS
OKLAHOMA	BB 37	March 1914	September 1944	NYS
PENNSYLVANIA	BB 38	March 1915	August 1946	NNS
ARIZONA	BB 39	June 1915	December 1941	NYNY
NEW MEXICO	BB 40	April 1917	July 1946	NYNY
MISSISSIPPI	BB 41	January 1917	September 1956	NNS
IDAHO	BB 42	June 1917	July 1946	NYS
TENNESSEE	BB 43	April 1919	February 1947	NYNY
CALIFORNIA	BB 44	November 1919	February 1947	MINY
COLORADO	BB 45	March 1921	January 1947	NYS
MARYLAND	BB 46	March 1920	April 1947	NNS
WASHINGTON	BB 47	September 1921	Never active	NYS
WEST VIRGINIA	BB 48	November 1921	January 1947	NNS
SOUTH DAKOTA	BB 49	Never completed	N/A	NYNY
INDIANA	BB 50	Never completed	N/A	NYNY
MONTANA	BB 51	Never completed	N/A	MINY
NORTH CAROLINA	BB 52	Never completed	N/A	NNY
IOWA	BB 53	Never completed	N/A	NNS
MASSACHUSETTS	BB 54	Never completed	N/A	BS
NORTH CAROLINA	BB 55	June 1940	June 1947	NYNS
WASHINGTON	BB 56	June 1940	June 1947	PNY
SOUTH DAKOTA	BB 57	June 1941	January 1947	NYS
INDIANA	BB 58	November 1941	September 1947	NNS
MASSACHUSETTS	BB 59	September 1941	March 1947	BS
ALABAMA	BB 60	February 1942	January 1947	NNY
IOWA	BB 61	August 1942	1991	NYNY
NEW JERSEY	BB 62	December 1942	1991	PNS
MISSOURI	BB 63	January 1944	1991	NYNS
WISCONSIN	BB 64	December 1943	1991	PNY
ILLINOIS	BB 65	Never completed	N/A	PNS
KENTUCKY	BB 66	Never completed	N/A	NNY
MONTANA	BB 67	Never completed	N/A	PNY
OHIO	BB 68	Never completed	N/A	PNY
MAINE	BB 69	Never completed	N/A	NYNY
NEW HAMPSHIRE	BB 70	Never completed	N/A	NYNY
LOUISIANA	BB 71	Never completed	N/A	NNY

APPENDIX IV: Selected Historic Photographs of MISSOURI. All photographs courtesy of United States Navy.

Photo # NH 45920 USS Missouri before launching

Photo # NH 96796 Driving first rivet during USS Missouri's keel laying, 1941

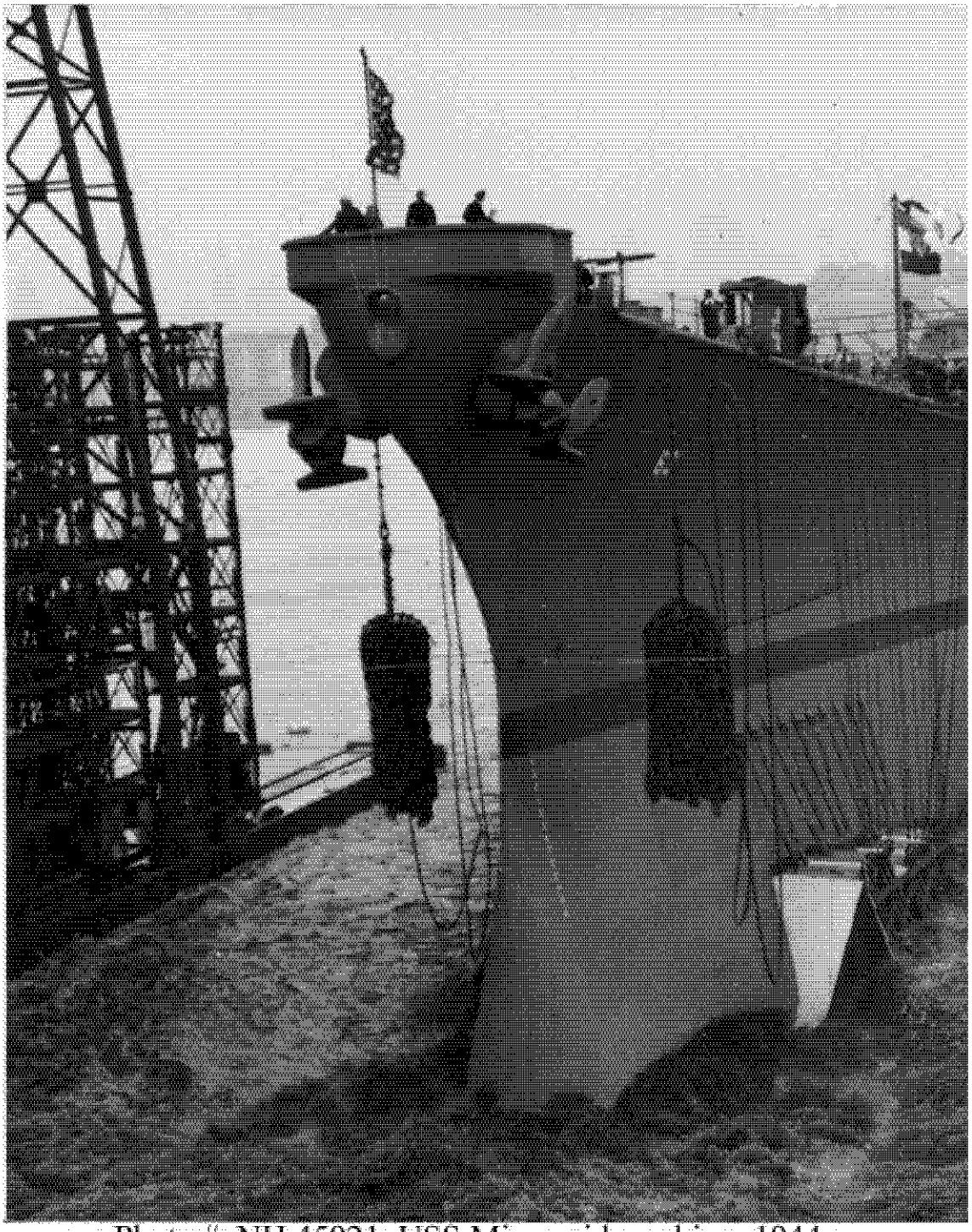

Photo # NH 45921 USS Missouri launching, 1944

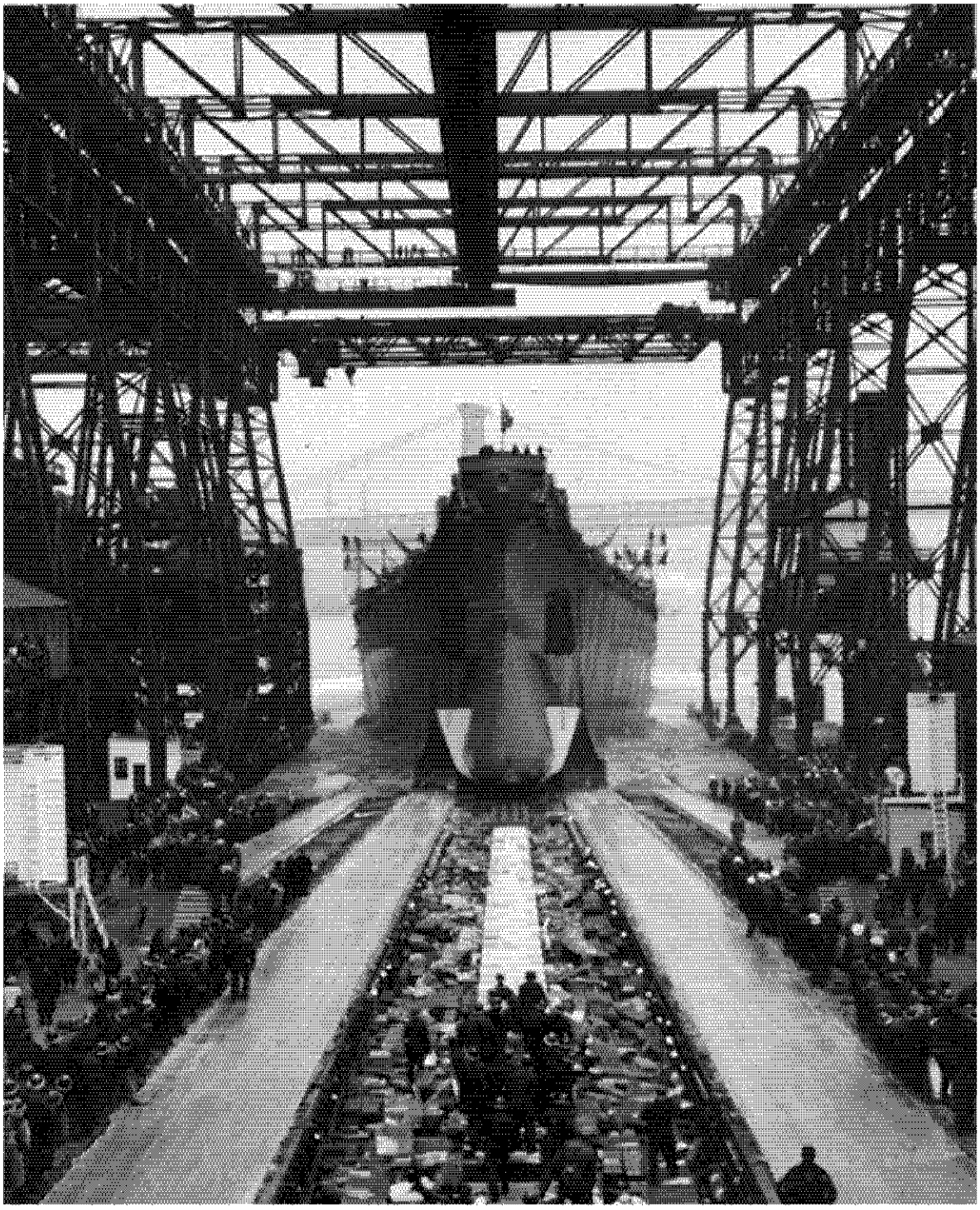

Photo # NH 45925 USS Missouri launching, New York, 1944

Photo # K-4575 USS Missouri on shakedown, 1944

Photo # K-4600 Capt. Wm. M. Callaghan on USS Missouri, 1944

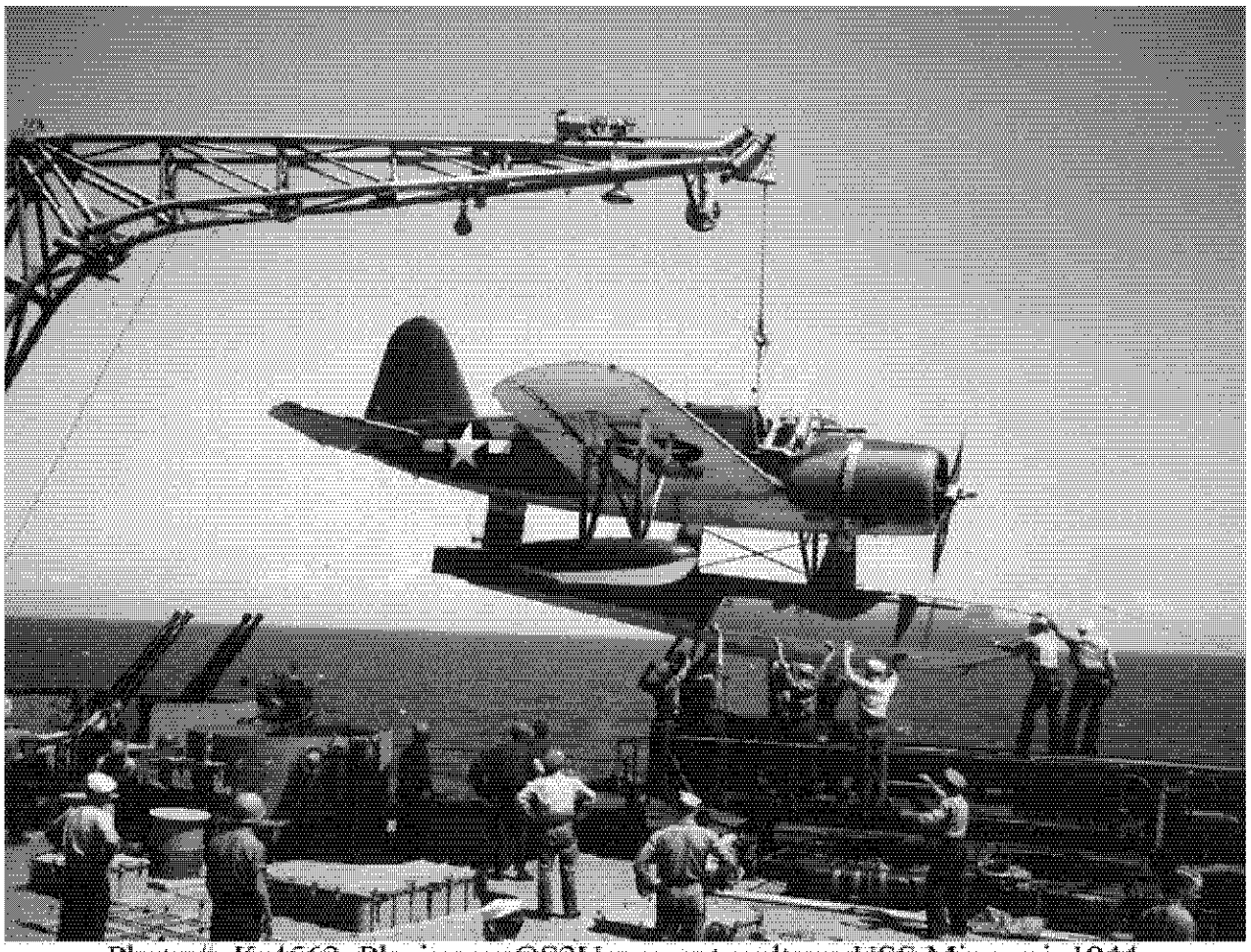

Photo # K-4562 Placing an OS2U on a catapult, on USS Missouri, 1944

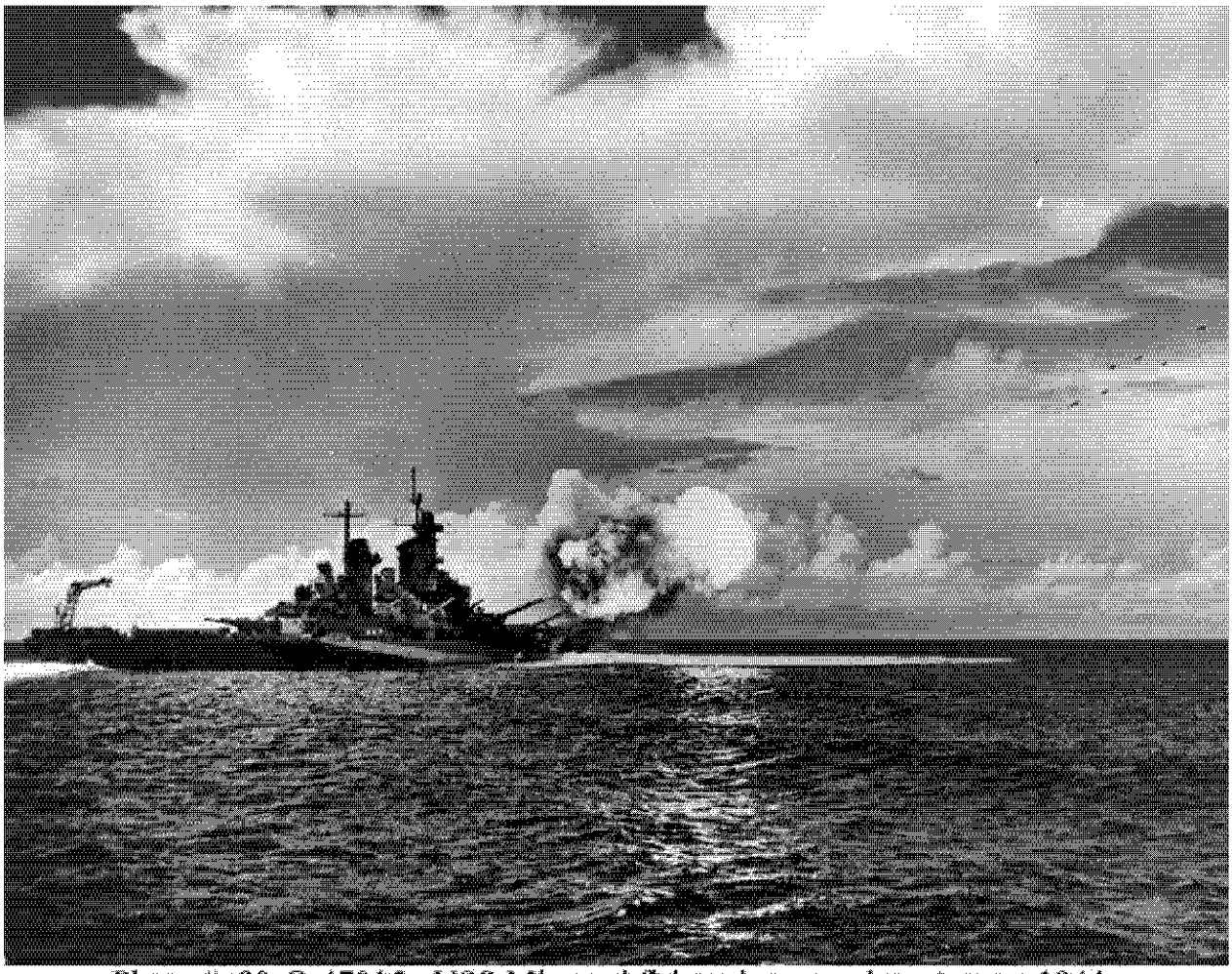

Photo # 80-G-47015 USS Missouri firing six-gun salvo, August 1944

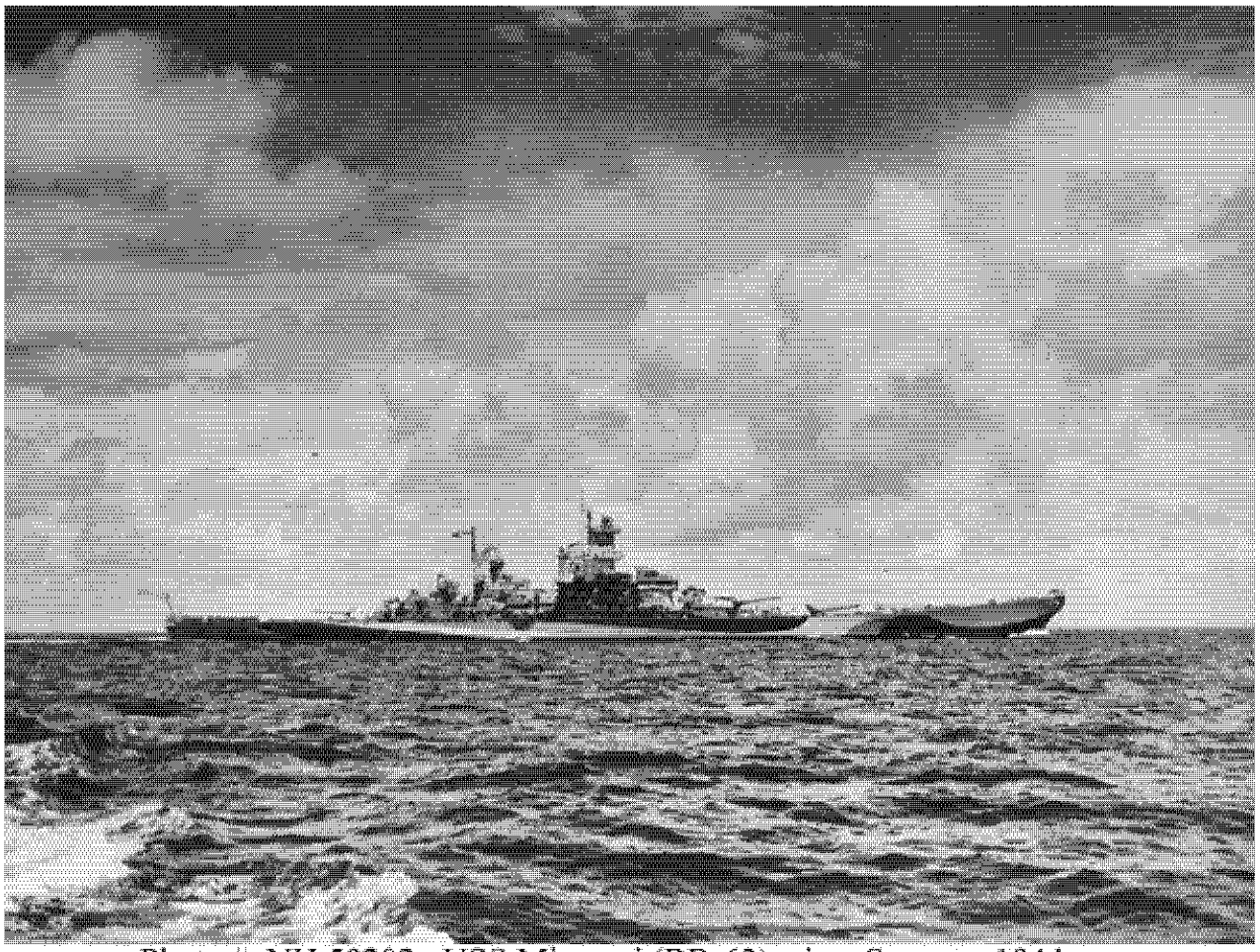

Photo # NH 50202 USS Missouri (BB-63), circa Summer 1944

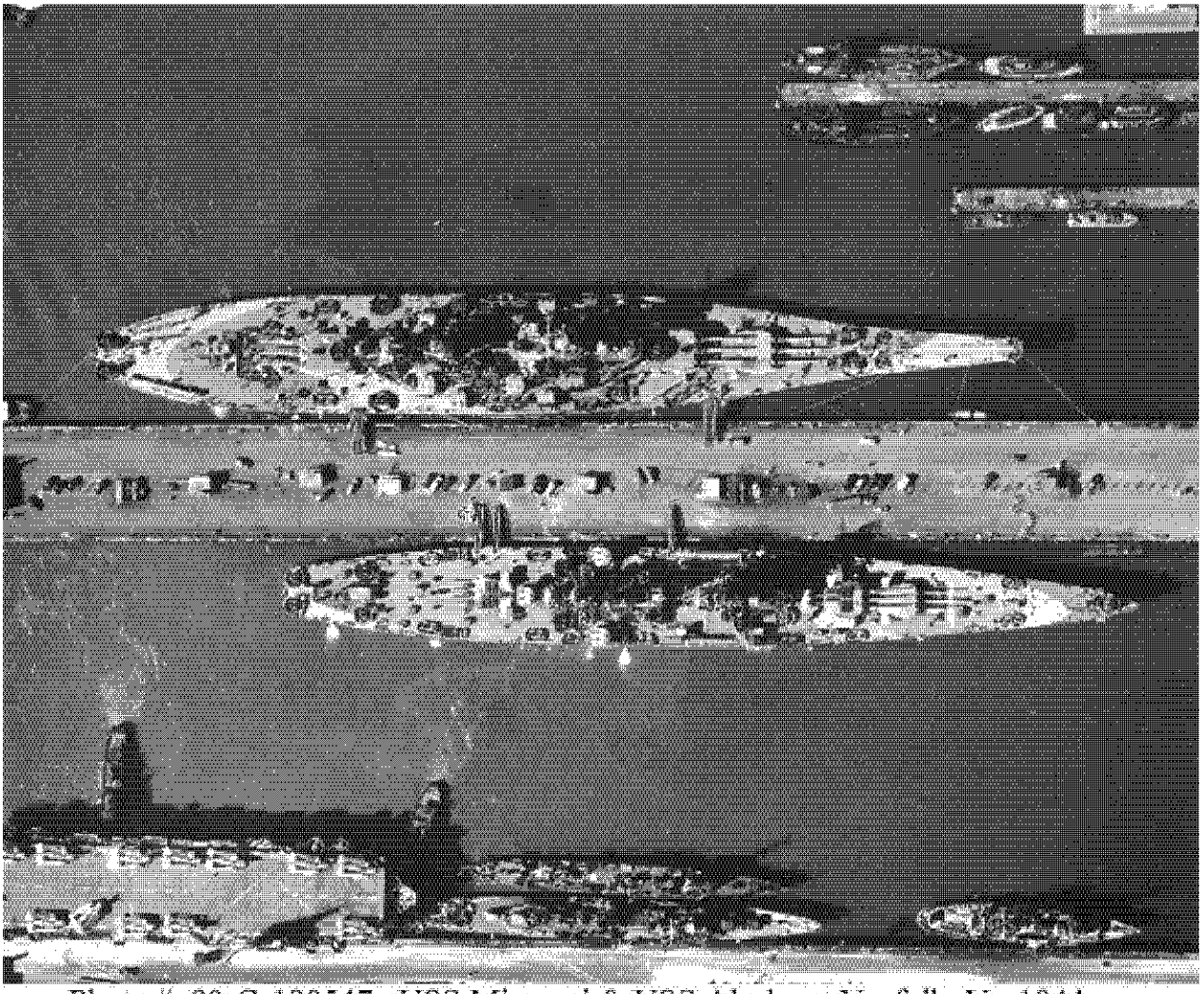

Photo # 80-G-190547 USS Missouri & USS Alaska at Norfolk, Va, 1944

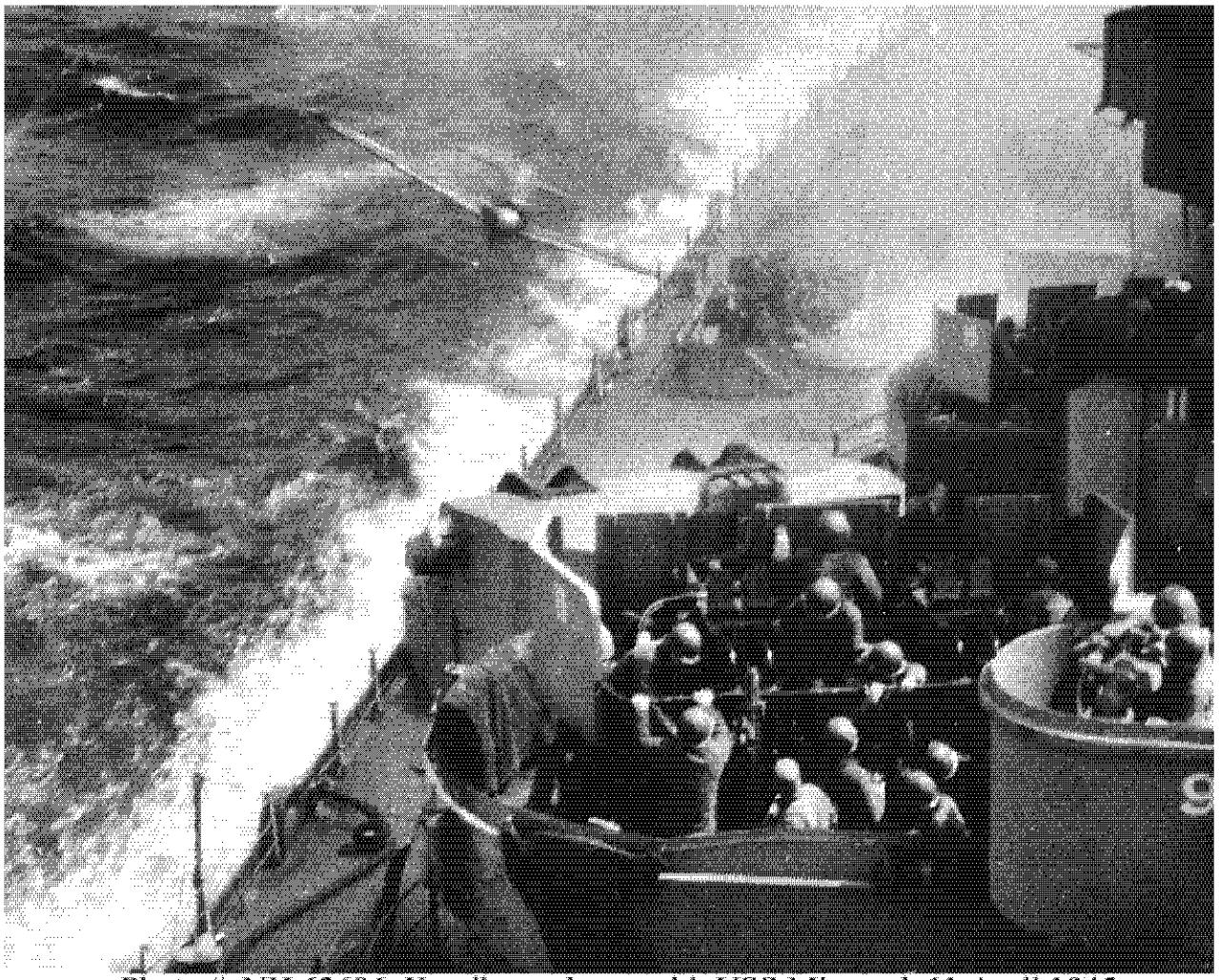

Photo # NH 62696 Kamikaze about to hit USS Missouri, 11 April 1945

Photo # NH 96781 USS Missouri & USS Iowa off Japan, 20 August 1945

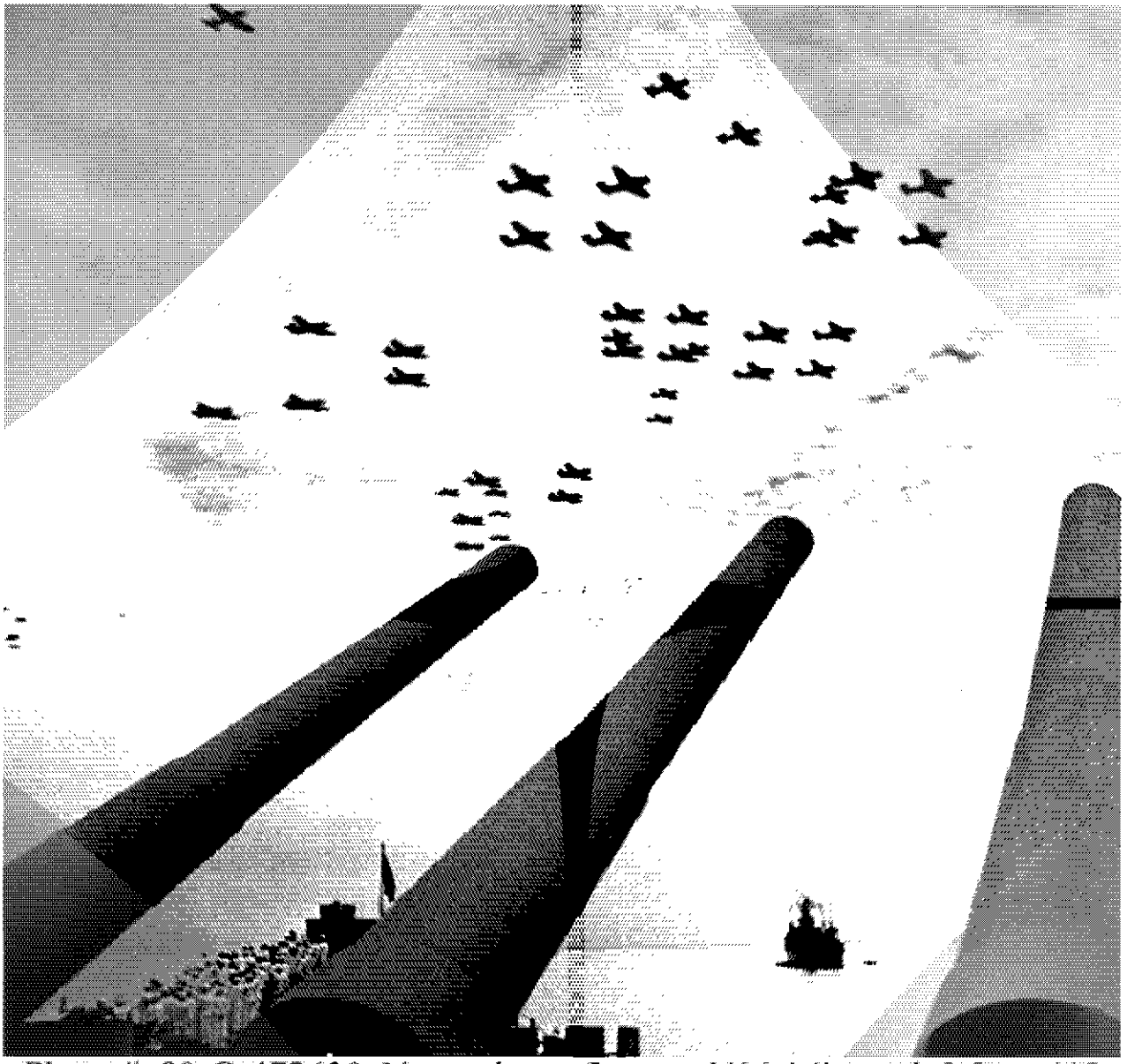

Photo # 80-G-472630 Navy planes fly over USS Missouri, 2 Sept. '45

Photo # 80-G-332701 Gen. Umezu signs instrument of surrender, 2 Sept. 1945

Photo # 80-G-700862 Missouri's bow frames Mt. Fuji, 1945

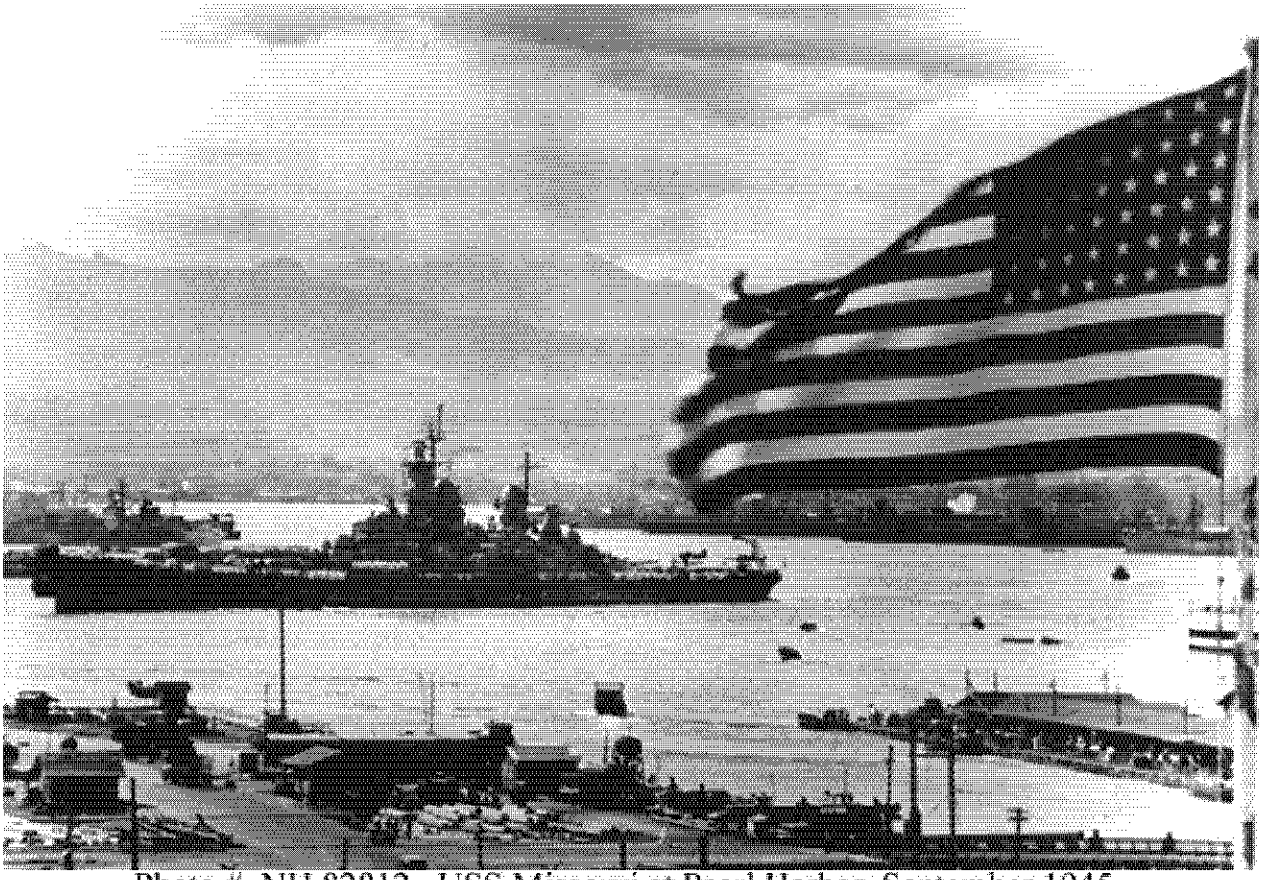

Photo # NH 82812 USS Missouri at Pearl Harbor, September 1945

Photo # 80-G-701369 USS Missouri in Panama Canal, Oct. 1945

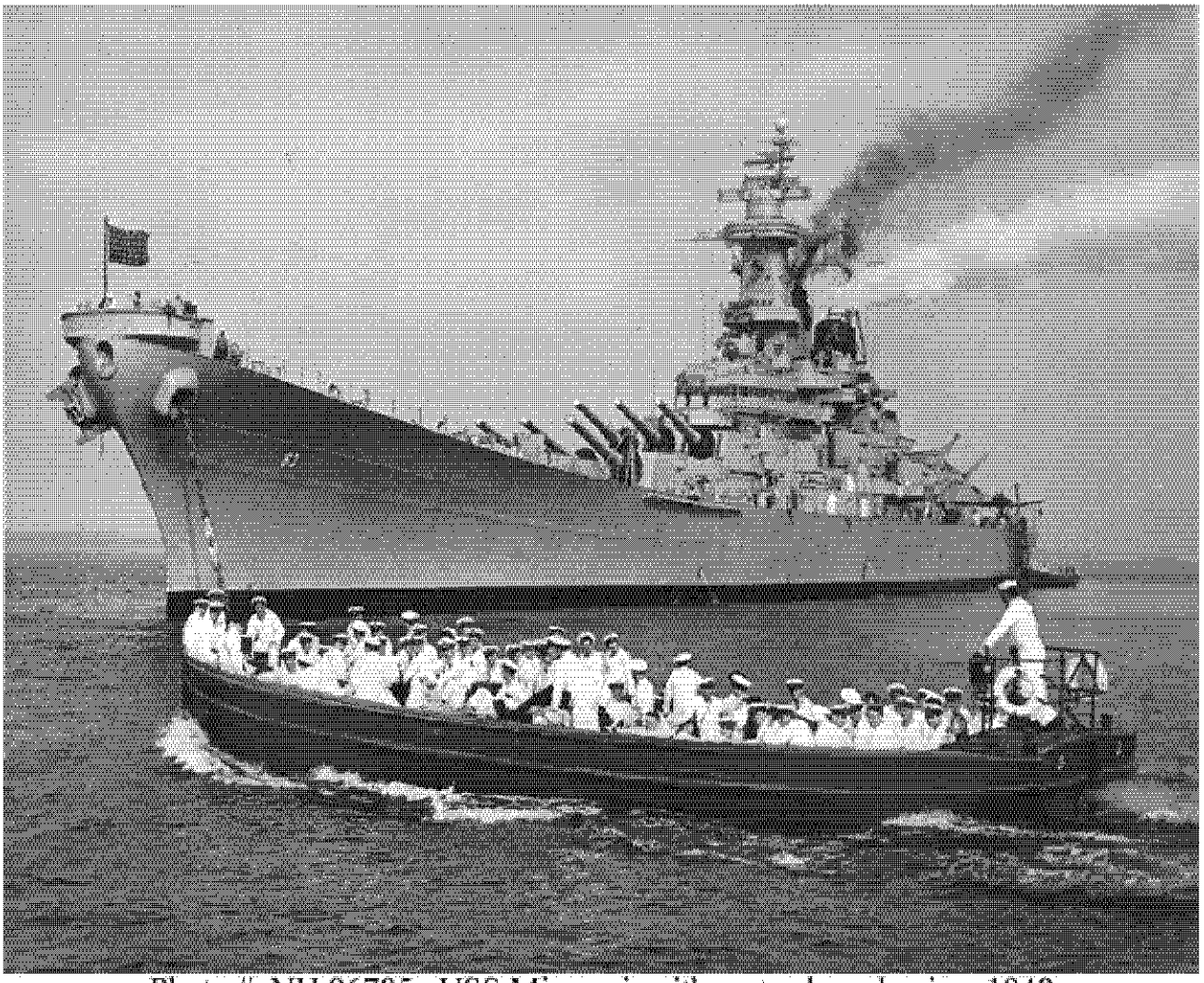

Photo # NH 96785 USS Missouri, with motor launch, circa 1948

80-G-421049 USS Missouri bombarding Chongjin, Korea, October 1950

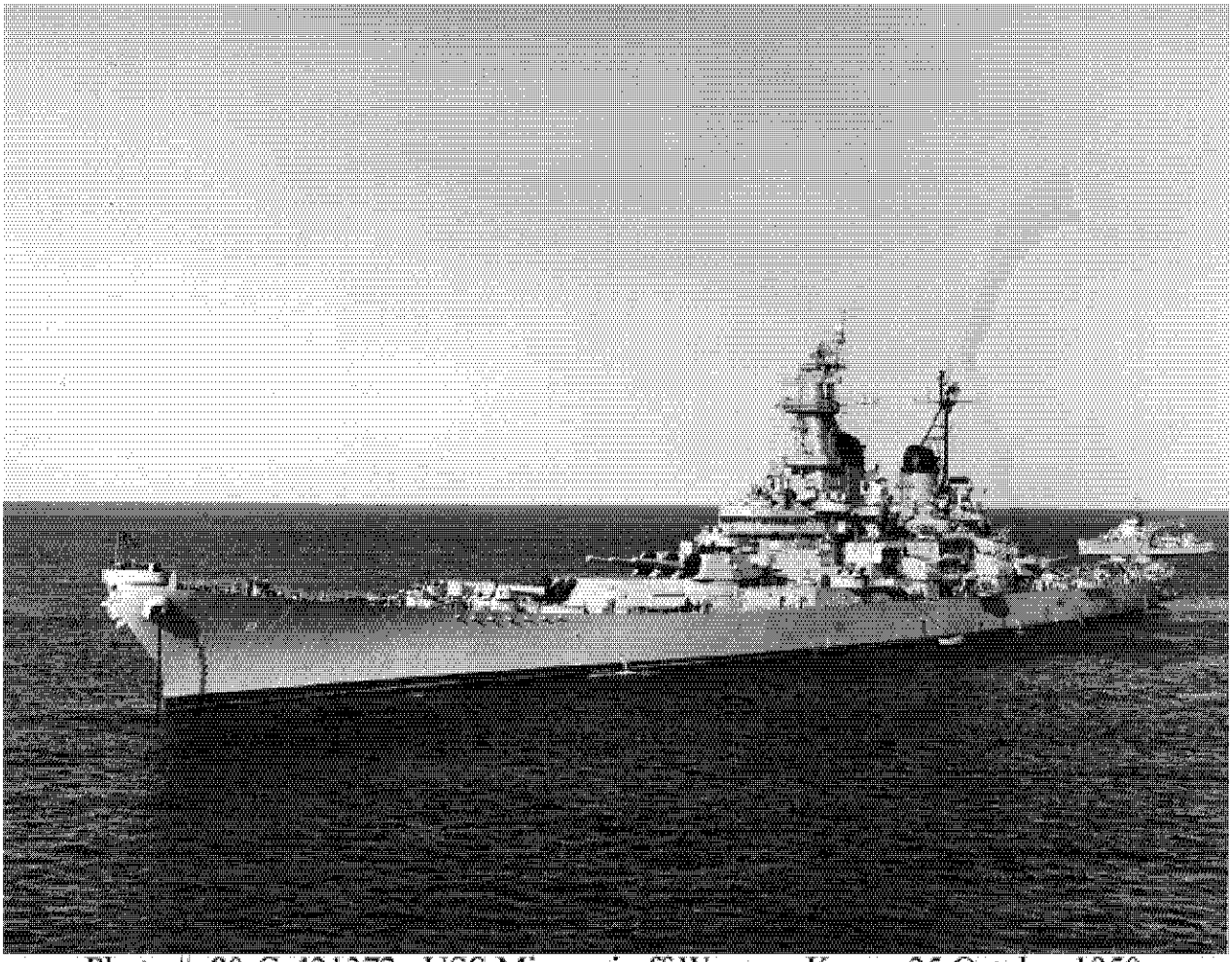

Photo # 80-G-421372 USS Missouri off Wonsan, Korea, 25 October 1950

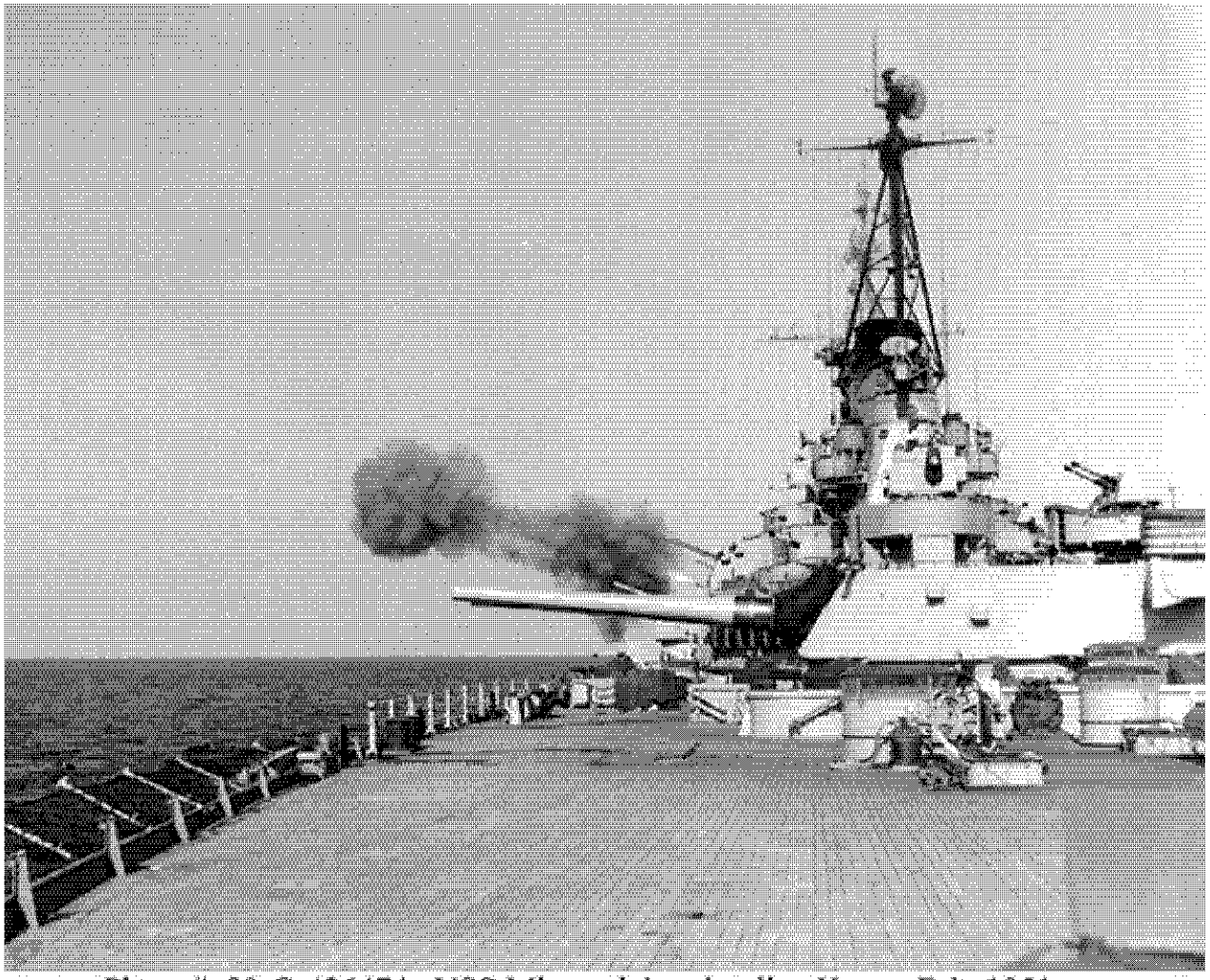

Photo # 80-G-426474 USS Missouri bombarding Korea, Feb. 1951

Photo # NH 96786 USS Missouri firing forward turret gun, 1987

Photo # NH 96794 USS Missouri, 1987

Tugs nudge MISSOURI alongside the dock she will occupy as a museum ship. ARIZONA memorial in the foreground.

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